

Additional Attributes

I need attributes in my metadata that are specific to my product

I need attributes in my metadata that are specific to my product

Overview

The ECHO and ISO metadata models both include the ability to add non-standard elements required by specific communities:

- ECHO additional attributes are parameters, also known as Product-Specific Attributes (PSAs), which further describe the data represented in each granule within a collection. These values are important search criteria for the granules.
- ISO 19115: This International Standard provides standard metadata and an associated structure that will serve a wide variety of digital geographic data. The definitions and domain values are intended to be sufficiently generic to satisfy the metadata needs of various disciplines. However, the very diversity of data means that generic metadata may not accommodate all applications. The standard provides rules for defining and applying additional metadata to better serve special user needs.

ECHO Additional Attributes have the following properties:

- Name – Unique name of the additional attribute.
- DataType – Data type of the additional attribute, chosen from the supported list of types.
- Description – A textual description of the attribute to help end users understand the purpose and data represented by the attribute.
- MeasurementResolution – Identifies the smallest unit increment to which the parameter value is measured.
- ParameterRangeBegin – Minimum value of all attribute values that will be provided by the collection or granules.
- ParameterRangeEnd – Maximum value of all attribute values that will be provided by the collection or granules.
- ParameterUnitsOfMeasure – Unit of measure for parameter (e.g. AVHRR: unit of geophysical parameter-units of geophysical parameter.)
- ParameterValueAccuracy – Estimate of the accuracy of the assignment of attribute value. This can be specified in percent or the unit with which the parameter is measured.
- ValueAccuracyExplanation – Defines the method used for determining the parameter value accuracy.

Recommendations for ISO 19115 and 19115-1

The ECHO Collection Level Metadata includes 149 structured elements and over 300 Additional Attributes, so they are an important part of the existing metadata. There are two very broad groups of additional attributes. The first group represents concepts that are included in the ISO model. These are discussed in the Translation Details section below. Other additional attributes represent concepts that are not included in the ISO models. These are being added to the ISO metadata using model extensions. These need to be classified in order to attach them to the correct object in the ISO metadata. Preliminary categories and examples are shown here. These will almost certainly change as the categories are reviewed.

Category Name	Definition	Examples
citation.date	A date related to the resource. Generally mapped to a date object in the citation. May need to extend dateType codelist.	AcquisitionDate, GenerationDateandTime, LatestAcquisitionDate
citation.identifier	An identifier for the resource.	SEQUENCE, FRAME_ID, GRANULENUMBER, MAX_FRAME_ID, MIN_FRAME_ID, OrderingId, ASTERGRANULEID, FileNumbe
citation.pointOfContact	Information about a person or organization associated with the resource.	ScienceTeamWebSite
contentInformation	Information or statistical description of the content of the resource.	Names that include Pct, PERCENT. Many of these attributes are actually quality information. They are added to contentInformation in order to simplify access and to keep it more consistent with approach used in ECHO. More sophisticated quality assessments will go in DQ_DataQuality
descriptiveKeyword	Miscellaneous information that might support discovery	ASCENDING_DESCENDING, AscendingDescendingFlg,

distribution.url	Information related to the distribution of the resource	OPeNDAPServer, DigitalFileSize, ArchiveLocation,
distributionInformation	Information related to the distribution of the resource	DigitalFileSize, ArchiveLocation,
geographicIdentifier	Identifier of geographic feature associated with the resource	HORIZONTALTILENUMBER, TileID, VERTICALTILENUMBER, Cycle, Instance, ReferenceOrbit, Track, EndingPolygonNumber, NominalPassIndex, StartingPolygonNumber, Track_Segment, AIRSAR_FLIGHT_LINE, Path, CENTER_FRAME_ID, PATH_NUMBER, FlightPath,
instrumentInformation	Information about the instrument used to collect the data	All instrumentCharacteristics, , Instrument_State, Instrument_State_Date, Instrument_State_Time, VNIR1_ObservationMode, VNIR2_ObservationMode, GainBand1, GainBand2, GainBand3, GainBand4, GainBand5,
lineage	Information related to sources and process steps used to create the resource.	ALBEDOFILEID, BRDFCODEID, BRDFDATABASEVERSION, ClimateSeedSource, INPUTPRODUCTRESOLUTION, PDS_ID, INPUTFILERESOLUTION
processingInformation	Information about process steps used to create the resource.	PROCESSVERSION, Timing_Bias, Timing_Bias_Date, Timing_Bias_Time, Timing_Drift, Timing_Drift_Date, Timing_Drift_Time, Range_Bias, Range_Bias_Date, Range_Bias_Time,
processStep	Information about a specific processStep	ASTERProcessingCenter
qualityInformation	Information related to the quality of the resource	QA FRACTION GOOD QUALITY, QA FRACTION NOT PRODUCED CLOUD, QA FRACTION NOT PRODUCED OTHER, QA FRACTION OTHER QUALITY, OrbitQuality, NDAYS_COMPOSITED, PERCENTSUBSTITUTEBRDFS, Band1_Available, Band10_Available, Band11_Available, Band12_Available
		The distinction between this category and contentInformation might be arbitrary. It could be that some/all of these fit better in contentInformation
resourceFormat	Information about the format of the resource	FileFormat

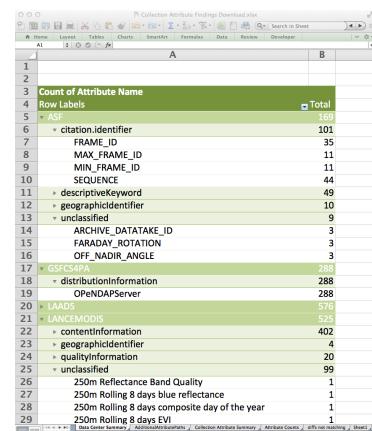
Preliminary AdditionalAttribute Classification

Preliminary classifications for many additional attributes have been made based on the names and the descriptions extracted from collection metadata. These choices are documented in the Data Center Summary tab of this [spreadsheet](#). This tab includes a pivot table that summarizes information gleaned from the AdditionalAttributes included in over 3500 ECHO collection records. The pivot table gives counts of additional attributes at three levels of summarization: Data Center, AdditionalAttributeType, and Name. Click the triangles next to the labels to open/close a layer.

The screenshot shows that collection records from the Alaska SAR Facility (ASF) include a total of 169 additional attribute, the majority of which (101) are in the citation.identifier class. In that class, FRAME_ID is most commonly used and it occurs in 35 collections. It also shows that ASF has three unclassified additional attributes (ARCHIVE_DATATAKE_ID, FARADAY_ROTATION, and OFF_NADIR_ANGLE), each of which occurs in three collections.

The screenshot also shows that GSFC4PA uses only one additionalAttribute (OPeNDAPServer) that it is in the distributionInformation class, and that it occurs in 288 collections (actually this additionalAttribute was reclassified since to the more descriptive distribution.url class).

The pivot table allows exploration of a number of aspects of the distribution of additionalAttributes across Data Centers and types. Enjoy...



Conceptual Model (UML)

ISO 19115 is being extended to include ECHO additional attributes (and characteristics). We define the structures that are used in the extension and, because we are adding ECHO Additional Attributes, the existing structure is a good candidate for the structure in the extension.

The conceptual structure of the ECHO additional attributes and the proposed ISO structure are shown in the figure. The current ECHO practice is to define the properties of Additional Attributes in collection metadata and to provide values in the granule metadata. In order to support that practice

Unknown Attachment

the additional attribute definition was made a separate object in the proposed ISO model. In addition, three new properties were proposed (shown in red):

1. type : EOS_AdditionalAttributeTypeCode - a codelist that gives the type of the additionalAttribute. Values for this codelist are TBD, but potential candidates include: contentInformation, qualityInformation, instrumentInformation, processingInformation, distributionInformation, ... This is different than the dataType for the additional attribute.
2. identifier : MD_Identifier - a unique identifier for the additionalAttribute. This MD_Identifier includes the identifier and information about the authority that guarantees uniqueness.
3. dataType : EOS_AdditionalAttributeDataTypeCode - a codelist that gives the data type for the additional attribute. The values are the same as those of the ECHO DataType (i.e. STRING, FLOAT, INT, BOOLEAN, ...). Note: many of the current occurrences of this field are lower case and so do not match the restriction in the ECHO schema.

Implementation (XML)

```
<eos:AdditionalAttributes xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://earthdata.nasa.gov/schema/eos ..../schema.xsd"
  xmlns: eos="http://earthdata.nasa.gov/schema/eos"
  xmlns:gco="http://www.isotc211.org/2005/gco"
  xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:xlink="http://www.w3.org/1999/xlink">
  <eos:EOS_AdditionalAttributes>
    <eos:additionalAttribute>
      <eos:EOS_Attribute id="ID001" uuid="uuid1">
        <eos:reference>
          <eos:EOS_AttributeDescription id="ID002" uuid="uuid2">
            <eos:type>
              <eos:EOS_AttributeTypeCode
                codeList="http://earthdata.nasa.gov/metadata/resources/"
                codeListValue="additionalAttributeType">additionalAttributeType</eos:EOS_AttributeTypeCode>
            </eos:type>
            <eos:identifier>
              <gmd:MD_Identifier id="ID003" uuid="uuid3">
                <gmd:code>
                  <gco:CharacterString>Unique identifier for the
                    additionalAttribute</gco:CharacterString>
                </gmd:code>
                <gmd:MD_Identifier>
              </eos:identifier>
            <eos:name>
              <gco:CharacterString>Name of the additionalAttribute</gco:CharacterString>
            </eos:name>
            <eos:description>
              <gco:CharacterString>This attribute provides a description for the
                additionalAttribute.</gco:CharacterString>
            </eos:description>
            <eos:dataType>
              <eos:EOS_AttributeDataTypeCode
                codeList="http://earthdata.nasa.gov/metadata/resources/"
                codeListValue="STRING">STRING</eos:EOS_AttributeDataTypeCode>
            </eos:dataType>
            <eos:measurementResolution>
              <gco:CharacterString>This attribute will be used to identify the smallest unit increment
                to which the additionalAttribute value is measured.</gco:CharacterString>
            </eos:measurementResolution>
            <eos:parameterRangeBegin>
              <gco:CharacterString>This attribute provides the minimum value of additionalAttribute over
                whole collection.</gco:CharacterString>
            </eos:parameterRangeBegin>
            <eos:parameterRangeEnd>
              <gco:CharacterString>This attribute provides the maximum value of additionalAttribute over
                whole collection.</gco:CharacterString>
            </eos:parameterRangeEnd>
            <eos:parameterUnitsOfMeasure>
              <gco:CharacterString>The standard unit of measurement for a
                additionalAttribute.</gco:CharacterString>
            </eos:parameterUnitsOfMeasure>
            <eos:ParameterValueAccuracy>
              <gco:CharacterString>An estimate of the accuracy of the assignment of attribute
                value.</gco:CharacterString>
            </eos:ParameterValueAccuracy>
          </eos:EOS_AttributeDescription>
        </eos:reference>
      </eos:EOS_Attribute>
    </eos:additionalAttribute>
  </eos:EOS_AdditionalAttributes>

```

```
</eos:parameterValueAccuracy>
<eos:valueAccuracyExplanation>
    <gco:CharacterString>This defines the method used for determining the parameter value
accuracy that is given for this additionalAttribute.</gco:CharacterString>
    </eos:valueAccuracyExplanation>
</eos:EOS_AdditionalAttributeDescription>
</eos:reference>
<eos:value>
    <gco:CharacterString>This attribute contains the value of the additionalAttribute for all
granules across a given collection</gco:CharacterString>
</eos:value>
</eos:EOS_AdditionalAttribute>
</eos:additionalAttribute>
<eos:additionalAttribute xlink:href="http://componentService/uuid1" xlink:title="additionalAttribute
with value"/>
<eos:additionalAttribute>
    <eos:EOS_AdditionalAttribute>
        <eos:reference xlink:href="http://componentService/uuid2" xlink:title="additionalAttribute
definition"/>
        <eos:value>
            <gco:CharacterString>This attribute contains the value of the additionalAttribute for all
granules across a given collection</gco:CharacterString>
        </eos:value>
    </eos:EOS_AdditionalAttribute>
```

```

</eos:additionalAttribute>
</eos:EOS_AdditionalAttributes>
</eos:AdditionalAttributes>

```

Usage

Type	ISO xPath
citation.date	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:citation/gmd:CI_Citation/gmd:date/gmd:CI_DigitalObjectIdentifier/gmd:otherProperty
citation.identifier	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:citation/gmd:CI_Citation/gmd:identifier/gmd:otherProperty
citation.website	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:citation/gmd:CI_Citation/gmd:citedResponsibleParty/gmd:CI_OnlineResource/gmd:otherProperty
contentInformation	/gmi:MI_Metadata/gmd:contentInfo/gmd:MD_CoverageDescription/gmd:dimension/gmd:MD_Band/gmd:otherProperty
descriptiveKeyword	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:descriptiveKeywords/gmd:MD_Keywords/gmd:otherProperty
distribution.url	/gmi:MI_Metadata/gmd:distributionInfo/gmd:MD_Distribution/gmd:distributor/gmd:MD_Distributor/gmd:distributorTransfers/gmd:MD_Contact/gmd:otherProperty
distributionInformation	
geographicIdentifier	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:extent/gmd:EX_Extent/gmd:geographicElement/gmd:MD_Spatial/gmd:otherProperty
instrumentInformation	/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/eos:InstrumentInformation
lineage	
processingInformation	/gmi:MI_Metadata/gmd:dataQualityInfo/gmd:DQ_DataQuality/gmd:lineage/gmd:LI_Lineage/gmd:processStep/gmi:LE_ProcessStep
processStep	
qualityInformation	/gmi:MI_Metadata/gmd:contentInfo/gmd:MD_CoverageDescription/gmd:dimension/gmd:MD_Band/gmd:otherProperty
resourceFormat	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:resourceFormat/gmd:MD_Format

Translation Details

Some existing AdditionalAttributes include information that fits in an existing ISO 19115 element without the NASA extensions. In this case, custom translations are required. The details of these translations are described here.

- citation.date
- citation.identifier
- distribution.url
- PROCESSVERSION

User	Edits	Comments	Labels
John Kozimor	7	0	0
Ted Habermann	6	0	3
Ross Bagwell	1	0	0